



June 2015

Economics vs. the Economy

William Rees



Economic theories, though social constructions, can reflect reality to varying degrees. In the face of dire environmental challenges, adopting a realistic theory is key to the survival of global civilization. The neoliberal emphasis on limitless growth and monetary flows, a relic of nineteenth century thinking, abstracts away from biological conditions. By contrast, ecological economics—as distinct from environmental economics, which remains wedded to the neoliberal growth paradigm—understands the economy as a subsystem of the ecosphere and envisions a steady-state economy embedded within natural constraints. Achieving this equitably will require significant redistribution of wealth and income, reduction of material throughput, and a transition away from fossil fuels. Although the neoliberal paradigm remains dominant, its lack of fitness to current realities gives hope that an ecological alternative could ascend.

Social Constructs and Social Reality

Is there anything we can say about economics that takes us beyond pure “conjecture”? How can we tell whether one theorist’s interpretation of the economic process is any “better” than another’s?

These questions are not as simple as they seem. Of the many unique qualities that set *Homo sapiens* apart from other sentient beings, one of the most important is that we humans tend to create our own “realities.” To be more precise, we make up stories about almost everything, give tenacity to these stories through social discourse and repetition, and then “act out” the stories as if they were reality. Tribal myths, religious doctrines, political ideologies, academic paradigms, and grand cultural narratives are just some of the fabrications that can make or ruin individual lives and set the course for whole societies. Sociologists call the general phenomenon the “social construction of reality” (though it would be more accurate to refer to the social construction of shared *perceptions*). The fact of “social construction” provides a useful frame through which to assess the relative merits of neoliberal growth economics versus Herman Daly’s steady-state ecological economics for a full world.¹

It is important to distinguish between “the economy” and “economics.”

To begin, it is important to distinguish between “the economy” and “economics.” Both are made-up concepts, but with a significant difference. We define the economy as that set of activities by which human agents identify, develop/exploit, process, and trade in scarce resources. It generally encompasses everything associated with the production, allocation, exchange, and consumption of valuable goods and services, including the behavior of various agents engaged in economic activity. Different economies vary considerably in sophistication and organizational structure. However, all economies are *real* phenomena; people in every human society from primitive tribes through modern nation-states engage in economic activities as defined.

“Economics,” by contrast, is pure *abstraction*. It is that academic discipline dedicated to dissecting, analyzing, modeling, and otherwise describing the economy in simplified terms. Academic economists engage in the social construction of formalized models—verbal and arithmetic “paradigms”—about how the real economy works.

In fact, economists have advanced various competing economic paradigms to describe our modern, techno-industrial, mainly capitalist national and global economies. These differ substantially in terms of foundational principles, analytic tools, systemic scope, conclusions, and policy implications, particularly where the biophysical “environment” is concerned. This diversity should be no surprise: whatever their seeming conceptual elegance and analytic rigor, every economic paradigm is, at bottom, a socially-constructed figment of the human imagination, one that necessarily reflects the starting beliefs, values, and assumptions of its authors. And beliefs, values, and assumptions vary a great deal.

A realistic economic paradigm must reflect energy/material flows and biophysical processes.

These insights should give us pause. Paradigms of all kinds, even those with demonstrably sketchy origins, assert enormous power over expressed human behavior. Indeed, it is truly remarkable that individuals and whole societies live in the real biophysical world guided by the parameters of various myths, paradigms, social norms, and cultural narratives that may have only a tenuous grip on that same reality.

This brings us back to wondering how reasonable people might choose between neoliberal growth economics and steady-state economics, particularly in a time of ecological turmoil. Postmodernists of the extreme relativist persuasion might argue that, since all knowledge is socially constructed, there is no objective reality. Competing paradigms are therefore equally valid (as in “my vision of the economy is as good as yours!”). This is dangerously wrong-headed: humans construct only their beliefs, not reality. Relativistic equivalence is *itself* a constructed fiction. Culture critic Neil Postman astutely observed, “You may say, if you wish, that all reality [i.e., perception] is social construction, but you cannot deny that some constructions are ‘truer’ than others. They are not ‘truer’ because they are privileged; they are privileged because they are ‘truer.’”²

To be clear, we should acknowledge that many social constructs are pure illusion with no counterpart in nature (e.g., the tooth fairy or the notion of a fiery hell); others specify entities that actually exist in total indifference to how people conceive of them (e.g., the law of gravity or the biogeochemical cycling of nutrients). Postman is referring to constructs in the latter category. All social constructions of *real* phenomena are conceptual models, but a “truer” model will be supported by tangible evidence, not opinion or wishful thinking. “Truer” constructions are better maps that more fully and faithfully represent the real-world landscapes they purport to represent.

It is also important to recognize that while belief in some illusory constructs (e.g., “the sun rises in the East”) is inconsequential, allegiance to others can determine the fates of nations. How a society conceives of its economy, for example, really matters. Indeed, operating from a realistic economic paradigm may even be a key to the survival of global civilization.

Neoliberal Mechanics or Eco-thermodynamics?

So, what do we know about real-world economic activities that might guide us in constructing a “true” economic paradigm? By “true,” I mean one that, among other requirements, adequately reflects the energy/material flows and biophysical processes basic to all living things, including human beings. It is not an exaggeration to say that such a paradigm is a matter of survival. After all, the human system functions like a multi-cellular organism except that, in addition to our bio-metabolic demands, we also have to account for humanity’s unique industrial metabolism. Six facts about humanity and the natural world seem particularly relevant:

The neoliberal paradigm is a relic of nineteenth century thinking.

1. All human economies are confined to planet Earth, i.e., they function *within* the ecosphere.
2. The entire human enterprise—our physical bodies, our possessions, and the infrastructure needed to maintain the functional integrity of the whole—is made from energy and materials that we extract from ecosystems and inanimate nature (i.e., from self-producing and non-renewable forms of so-called “natural capital”).
3. All energy and material flows/processes associated with economic activity are governed by well-known laws of physics and chemistry.
4. Real economies, societies, and ecosystems are complex systems characterized by lags, thresholds, and other forms of nonlinear behavior (complex systems dynamics) that make their trajectories under stress inherently difficult to predict.
5. The energy and material pathways associated with the acquisition of resources and the disposal of wastes require people to interact with both other species (ecosystems) and inanimate nature. In fact, a qualitative and quantitative record of these flows would describe humanity’s material ecological niche; the goods economy roughly maps the human ecosystem.
6. The ecosphere is a finite entity with variable, but ultimately limited, regenerative and waste assimilation capacities.

The next question is, how well do mainstream economics and Daly’s ecological economics respectively incorporate these framing constraints? The short answer for the neoliberal paradigm is “virtually not at all.” The dominant economics in this twenty-first century of increasing ecological turmoil is a relic of nineteenth century thinking. Its intellectual founders, motivated by the remarkable success of Newtonian physics, set out explicitly to model economics as the “mechanics of utility and self-interest.” The discipline consequently lost sight of the social context and purpose of economies and became totally abstracted from biological reality. Practitioners increasingly based their models on mechanical cause-effect logic and other simplistic assumptions in the service of analytic tractability. Growth through efficiency gradually became its *raison d’être*.

Analytic mechanics may have been a suitable platform for the design of early automobile engines, but it is grossly inadequate to reflect the lags, tipping points, multiple equilibria, irreversible transformations, and other complex dynamics of industrial economies or of the social and ecological systems within which they are embedded. However, since the scale of human activity relative to “the environment” was initially negligible, neoclassical economists were able to ignore biophysical context with impunity until the 1960s.

As pollution and general eco-dysfunction finally became embarrassingly visible

The financialization of the economy reinforces the illusion that wealth creation is divorced from the material world.

(giving birth to modern environmentalism), the mainstream response was “environmental economics,” essentially an *extension* of the neoclassical growth-based paradigm. If environmental assets were being degraded, the solution was to monetize nature and let free markets do their magic. Put a price on pollution (i.e., “internalize the externalities”) and depend on market and technological efficiency gains to ease resource scarcity. Where that fails, human ingenuity, stimulated by rising prices, will find substitutes for any failing good or service provided by nature. As Nobel laureate economist Robert Solow famously wrote, “[t]he world can, in effect, get along without natural resources.”³ There was no perceived need to question the structural premises of the neoliberal model or its goal of unending growth through efficiency and technological progress. There are arguably no constraints on human ingenuity.

The fact that mainstream analysis focuses on money increases the gulf between conventional economics and the material world. (Money is itself an abstraction with no physical dimensions or theoretical limit.) The starting point for conventional analysis in every standard text is the seemingly self-generating and ever-expanding circular flow of money from firms to households and back again. This model ignores the unidirectional, irreversible energy and material counterflow that feeds the money circle. The circular flow represents the economy as “an isolated, self-renewing system with no inlets or outlets, no possible point of contact with anything outside itself.”⁴ Describing the economic process as a magical money flow with no reference to material throughput is akin to describing animal physiology in terms of the circulatory system with no reference to the digestive track. One might as well ask engineering students to fathom how “a car can run on its own exhaust” or biology students to accept that “an organism can metabolize its own excreta.”⁵

It gets worse. The financialization of the economy in recent years—the spectacular growth in both the absolute scale and proportion of money-wealth generated through otherwise unproductive paper trading—reinforces the illusion that wealth creation is divorced from the material world while (ironically) giving the benefactors ever greater access to real material goods.

We can summarize the neoliberal version of the economy as a kind of self-producing perpetual motion machine. In effect, expansionists see the economy as an independent, self-generating, ever-growing system that lacks any important connectedness to an apparently infinite “environment.” Thus conveniently suspended in conceptual space, the economy’s expansion is unfettered by physical laws and its ultimate scale unbound by Earthly limitations. The problem is that this “construct” is in stark violation of a proved systems theorem, Ashby’s Law of Requisite Variety, which states that the internal “variety” (diversity, complexity) of a management system must correspond to the variety of the system being managed if the manager is to maintain control. Or, in the late cyberneticist Stafford Beer’s more colorful prose, “we cannot regulate our interaction with any aspect of reality that our model of reality does not include...because we cannot, by definition, be conscious of it.”⁶ (Would you attempt

Ecological economics recognizes the economy as a subsystem of the larger ecosphere.

to fly the Starship Enterprise using a Volkswagen Beetle driver's manual?)

By contrast, ecological economics strives for "requisite variety." It recognizes the economy as an open, wholly dependent subsystem of the larger ecosphere, which is itself "finite, non-growing, and materially closed, although open to a continual, constant throughput of solar energy."⁷ This approach explicitly acknowledges that (a) the human subsystem can grow and maintain itself *only* by extracting resources from, and injecting its wastes back into, its host system and (b) the relevant material transformations are subject to natural law. The law of mass conservation and the first law of thermodynamics, for example, require that 100% of the energy and material resources extracted from the rest of the ecosphere to fuel the human economy quickly return to the ecosphere as waste. The second law of thermodynamics dictates that to grow and maintain a unit of "human enterprise," we must consume and dissipate a much larger quantity of "available" energy/matter sourced from the rest of the ecosphere—at least to the degree that we do not rely on the influx of solar energy. (Think soil erosion, accumulating atmospheric greenhouse gases, ocean acidification, and all other classes of pollution, biodiversity loss, and other resource depletion.)

It follows that when economic demand exceeds nature's supply (the regenerative and assimilative capacity of ecosystems), the human enterprise goes from living on sustainable "natural income" to becoming a parasite on the ecosphere. Further growth of the system is achieved by depleting the very income-producing natural capital that is required for the economy's existence and by filling waste sinks until they overflow. It is in this bio-thermodynamic sense that Herman Daly can legitimately assert that humanity now lives in an ecologically (over-)full world.

An increasingly tragic corollary of continuous economic growth relates to the ecological concept of "competitive exclusion." *Homo sapiens* competes with thousands of other species for the ecosphere's limited biocapacity, particularly the products of photosynthesis. Every increase in the human population with its attendant needs and wants requires the appropriation of other species' habitats, more intensive agriculture, and increased non-renewable resource exploitation with its attendant ecosystem pollution (which further reduces bio-capacity). On this finite Earth, the unconstrained growth of any one subsystem necessarily means the contraction, even extinction, of competing subsystems (other species) and the simplification of ecosystems. Competitive exclusion run amok provides a sufficient explanation for the accelerating loss of biodiversity that accompanies human population and economic growth.

Finally, ecological economics highlights the starkly ironic clash between the results of mainstream monetary analysis and the underlying biophysical reality. Neoliberal economists point to the modestly declining ratio of resource consumption per unit GDP as evidence that, through enhanced efficiency, the economy is "dematerializing."

The notion that the economy is “decoupling” from nature is a delusion.

In contrast, material flows studies comparing *Homo sapiens*’ exploitation of ecosystems with that of dozens of ecologically similar species show that human demands already exceed those of other organisms by orders of magnitude. Further, the human “ecological footprint” (the proportion of Earth’s biocapacity dedicated to supporting *Homo sapiens*) is still steadily increasing. With the application of increasingly aggressive exploitation technologies, humanity’s ecological niche continuously expands with the economy. *Homo sapiens* has become, directly and indirectly, the single most significant consumer organism (both herbivore and carnivore) in all the major ecosystems on Earth and the single greatest geological force modifying the face of the planet. These realities are hardly consistent with the (delusional) notion that the economy is “decoupling” from nature.

Contrary evidence notwithstanding, technology- and growth-favoring “eco-modernists” would still solve our ecological predicament through accelerated economic growth and renewed faith in technology (e.g., nuclear energy, geoengineering), particularly technologies that might facilitate the [non-existent] “decoupling [of] human development from environmental impacts.”⁸ This is advocacy for divine intervention. Our current state of overshoot results mainly from meeting the material demands of just the wealthiest fifth of the human population who consume 70% of the world’s economic output (the poorest 20 percent survive on only 2 percent). With billions in poverty and billions more to come, is there any Earthly development path that would meet the unsatisfied material needs, let alone wants, of the entire human family while reducing ecological impacts?

And the Winner Is...

It should by now be clear that ecological economics embodies a much “better” or “truer” representation of the relationship between the human enterprise and the rest of the ecosphere than does the neoliberal paradigm. Moreover, Daly’s advocacy of a “transition toward a steady-state economy focused on qualitative development, as opposed to quantitative growth” speaks to a logically consistent next step.⁹ (An economic steady state implies a more or less constant rate of energy and material throughput, compatible with the regenerative and assimilative capacities of the ecosphere.)

How might a rational society determine the appropriate level of resource exploitation and throughput? While Daly acknowledges that “the desired level of steady-state economy is crucial,” he stops short of speculating just how far the world has journeyed on its “limits to growth” trajectory.¹⁰ He thus avoids confronting the likelihood that a sustainable steady-state economy will be a materially much smaller economy than the present global enterprise.

This may be expedient—the idea of a steady state is challenging enough for most people; to contemplate material *contraction* lies beyond (conventional) reason. However, let us assume that the global goal should be to create a dynamic and more

Cultural evolution can proceed much more quickly than biological evolution.

equitable steady state that satisfies the basic needs of the entire human family within the means of nature. Our best environmental science tells us that world is already beyond “full”; we are *starting* from a state of overshoot. Thus, for the human enterprise to operate compatibly “within the means of nature,” merely curtailing growth is not sufficient. The data suggest that the global community needs to reduce fossil energy use, associated material consumption, and pollution by 50 percent or more by mid-century. To address egregious inequality, wealthy countries will have to reduce their energy/material throughput by 80 percent by 2050 and abandon fossil fuels entirely shortly thereafter. Such greater than average reductions by the rich are necessary to free up “ecological space” needed to improve material conditions in developing countries where increased consumption is both necessary and morally justified. Income/wealth redistribution is a necessary part of the steady-state sustainability package.

Evolving Past Neoliberalism

Genes and gene complexes can be defined as units of biological information that help determine the “fitness” of their possessors and can be passed on between generations. Similarly, we can think of technologies, paradigms, and ideologies as “memes” and “meme complexes,” units of cultural information that contribute to the fitness of society and can be transmitted between generations. Memes hold an advantage over genes in that they can also be transmitted *within* generations. Cultural evolution can therefore proceed more quickly than biological evolution.

This suggests an interesting corollary. Biological evolution proceeds by natural experiment through genetic mutation. Random mutations that significantly alter an organism’s “fitness” (how well it is adapted to its biophysical environment) are subsequently put to the test by that environment. Variations that enhance fitness (the ability to acquire resources and reproduce) will be passed on with greater frequency and will therefore accumulate in subsequent generations. By contrast, mutations that decrease survival and reproduction constitute failed experiments and are “selected out” by the environment. Evolution proceeds through trial and error.

What if competing meme complexes—e.g., neoliberal and ecological economics—are also subject to natural selection? Certainly, different economic paradigms can have differing effects on the seeming fitness of human societies. In the past, the material growth and technological progress associated with the neoliberal paradigm have proven extraordinarily successful in increasing resource acquisition, reproductive success, and the survival rates of people in industrial countries.

Today, however, this paradigm is manifestly too successful. Industrial society now imposes such an enormous entropic burden on its host environment that the ecosphere itself is changing to the point of becoming hostile to the contemporary human enterprise. Ecologically naïve beliefs, values, and assumptions that were harmless when the world was relatively empty have become a threat to civilization

Aimless growth may yet give way to true social development.

now that the world is ecologically full. Is it therefore not conceivable that growth-based neoliberal economics may soon be “selected out” and, with it, the compound mythic construct of perpetual growth and continuous technological progress? With the onset of global climate chaos and ecological decay, we may be seeing industrial capitalism’s unprecedented (material) success morphing into ignominious failure. Perpetual growth economics is a dead-end experiment.

Fortunately, we do have a nascent alternative, a steady-state ecological economics whose conceptual framing is entirely compatible with the structure and function of the ecosphere. To the extent that this meme might enhance humanity’s fitness, it holds promise that a flourishing steady-state civilization might yet emerge on Earth in this century. Aimless growth may yet give way to true social development, mere quantitative accretion to qualitative betterment.

What is the probability that some combination of good science, popular fear, and civic unrest will finally make of ecological economics an idea whose time has come? Will the new meme have time to take hold before the world is engulfed by the climate change, environmental refugees, and resource wars promised by staying our present course? Daly provides basic policy goals for transitioning to the steady state. But as he himself acknowledges, “it is something else entirely to say how we will secure the will, strength, and clarity of purpose to carry out these policies.”

The good news is that, if society does muster the political will in time, the great eco-economic leap forward in cultural evolution could be complete in as little as a generation.

Endnotes

1. This Viewpoint originated as a comment on Herman Daly’s GTI essay: “Economics for a Full World,” *Great Transition Initiative* (June 2015), <http://www.greattransition.org/publication/economics-for-a-full-world>.
2. Neil Postman, *Building a Bridge to the Eighteenth Century* (New York: Alfred Knopf, 2000), 6.
3. Robert Solow, “The Economics of Resources or the Resources of Economics,” *The American Economic Review* 54, no. 2 (May 1974): 10.
4. Herman Daly, *Steady-State Economics*, 2nd ed. (Washington, DC: Island Press, 1991), 196.
5. Op. cit., 197.
6. Stafford Beer, “I Said, You are Gods,” *Teilhard Review* 15, no. 3 (1981): 1-33.
7. Daly, “Economics for a Full World,” Figure 1.
8. John Asafu-Adjaye et al., “An Ecomodernist Manifesto,” April 14, 2015, www.ecomodernism.org/manifesto/. For a rebuttal, see at Jeremy Caradonna et al., “A Call to Look Past *An Ecomodernist Manifesto*: A Degrowth Critique,” May 6, 2015, www.resilience.org/articles/General/2015/05_May/A-Degrowth-Response-to-An-Ecomodernist-Manifesto.pdf.
9. The steady state is not to be confused with a stagnant state. A steady-state economy can be dynamic, constantly changing with the rise of new and the decline of “sunset” industries. It is an economy dedicated to qualitative improvement in well-being, not merely quantitative growth.
10. Daly, “Economics for a Full World,” Figure 3.

About the Author



William Rees is a professor at the University of British Columbia's School of Community and Regional Planning (SCARP). He founded SCARP's Environment and Resource Planning concentration and served as director of the School from 1994 to 1999. His research focuses on the public policy and planning implications of global environmental trends and the necessary ecological conditions for sustainable socioeconomic development, and he is best known as the originator of "ecological footprint analysis." He is also a founding member and former president of the Canadian Society for Ecological Economics; a co-investigator in the Global Integrity Project, aimed at defining the ecological and political requirements for biodiversity preservation; a Fellow of the Post-Carbon Institute; and a Founding Fellow of the One Earth Initiative.

About the Publication

Published as a Essay by the [Great Transition Initiative](#).

This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](#).



Cite as William Rees, "Economics vs. the Economy," *Great Transition Initiative* (June 2015).

About the Great Transition Initiative

The [Great Transition Initiative](#) is an international collaboration for charting pathways to a planetary civilization rooted in solidarity, sustainability, and human well-being.

As a forum for collectively understanding and shaping the global future, GTI welcomes diverse ideas. Thus, the opinions expressed in our publications do not necessarily reflect the views of GTI or the Tellus Institute.